

Study: Animals and humans eat clay to rid toxins

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A woman collects geophagic soil on Pemba Island, Zanzibar, Tanzania. (Sera Young)

(Medical Xpress) -- The phrase "eat dirt" takes on a whole new meaning when used by biologists, who have widely observed that humans, birds and mammals all engage in geophagy. A new Cornell study concludes that in humans, it's best explained as providing protection from dietary chemicals, parasites and pathogens.

So said lead author Sera Young, Ph.D. '08, of the study, published in the June issue of the *Quarterly Review of Biology*. Young will be a research scientist in nutritional sciences at Cornell beginning July 1 and is the author of "Craving Earth: Understanding Pica -- the Urge to Eat Clay, Starch, Ice and Chalk" (2011).

Reports of human geophagy have puzzled [biologists](#) for hundreds of years, said co-author Paul Sherman, Cornell professor of neurobiology and behavior. It has been described in almost every country but most frequently in the tropics.

Other previous explanations for geophagy have included hunger or the need to acquire such nutrients as iron, zinc or calcium.

The researchers analyzed 482 cultural accounts of human geophagy and 330 accounts of geophagy among 297 species of birds, reptiles and [mammals](#), including 70 primate species. Young and colleagues entered details of these accounts into a database and then looked for patterns to evaluate each hypothesis.

They found that people who practice geophagy never claim to do it just to fill an empty stomach; they eat only small amounts and do so even when food is plentiful. Similarly, the researchers found that the type of dirt people eat is rich in clay, which lacks bio-available nutrients, dispelling the idea that geophagy adds nutrients to a person's diet. Data suggest, in fact, that geophagic earth can bind such micronutrients as iron and zinc, which may explain the strong association between geophagy and anemia.

The researchers found that geophagy occurred most often among pregnant women and children in [tropical areas](#) where [pathogens](#) thrive. It was also associated with the [ingestion](#) of toxic substances and gastrointestinal distress. In pregnant women, immune systems are adaptively turned down so as not to reject the fetus, but at the same time, food-borne pathogens can be harmful to the health of both mother and fetus, said Sherman.

"Geophagy is most common in the first trimester of pregnancy, the time when the embryo is most vulnerable," Sherman said. Similarly, children

and adolescents are highly susceptible to toxins, which may explain why they also practice geophagy, he said.

People who eat dirt search out specific soils they consider to be clean and safe. The dirt is also typically carefully prepared and even heated before ingesting.

While this is the most comprehensive study examining geophagy in humans, according to the authors, previous animal research has shown that poisoned rats will eat clay when offered a variety of substances, and researchers also have documented that various primates including chimpanzees and such birds as parrots ingest clay soil after eating toxic fruits or experiencing gastrointestinal distress.

"In most of the places where people eat earth, they don't have as much access to medical treatment, and geophagy has been practiced long before modern medicine," said Sherman. "Geophagy has been something that has been looked down on, but it's not just a mistake -- rather clay is a natural medicament, which acts much like commercial Kaopectate."

Other co-authors include Cornell researchers Julius Lucks, who will start July 1 as an assistant professor of chemical and biomolecular engineering, and Gretel Pelto, a visiting nutritional scientist. The study was funded by the Hertz Foundation, National Institutes of Health, Wenner-Gren Foundation and the Stephen H. Weiss Presidential Fellowship fund at Cornell.

Provided by Cornell University

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